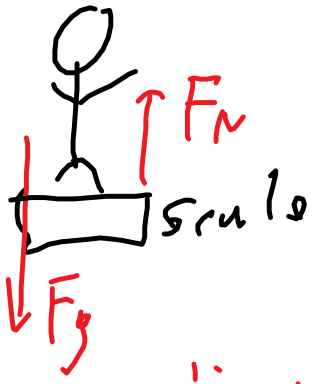
Go over Force problems

You stand on a scale in an elevator from the test. What does the scale read in every section. (say the scale reads in Newtons)



$F_{net} = \Sigma F = ma = F_N - F_g$

i) $a = \frac{3m/s}{2s} = 1.5 m/s^2$

$F_N = F_g + ma = m(9.8+1.5)$

reads 15% more

ii, iv, vii) v is constant so

$F_N = mg$

iii) $a = -1.5 m/s^2$ so it reads 15% less

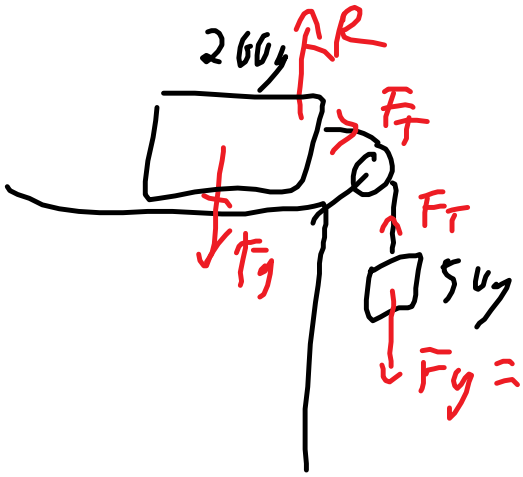
v) $a = -2.0 m/s^2$ so

F_N is 20% less

1. Determine the net force, acceleration and tension in the string between a 200 g mass and a 250g mass suspended over a pulley.

2. Determine the net force, acceleration and tension in the string between a 200 g mass on the table

and a 50g mass suspended over a pulley if a) frictionless b) the 200g mass experiences a 0.10 coefficient of friction



$F_g = mg = 0.050kg \times 9.81N$

$= 0.49N$

$F_{net} = ma$ (m: total)

$250g\,a = 0.49N$

$a = 1.962 m/s^2$

$a = 2.0 m/s^2$

$F_T = 0.200kg \times 1.962 m/s^2 = 0.39N$

$F_g - F_T = m_2 a$

$F_T - m_2(9.81 - 1.962) = 0.39N$

$F_{net} = F_{g_2} - \mu F_{N_1}$

$$F_{net} = F_{g_2} - \mu N_1$$

$$(m_1 + m_2)\,a = m_2 g - \mu m_1 g$$

$$(0.2 + 0.05)\,a = 0.25(9.81) - 0.1(0.2)9.81$$

$$a = 1.1772 = \boxed{1.2\ m/s^2}$$

$$F_{net} = m_1 a = F_T - \mu F_{g_1}$$

$$F_T = m_1 a + \mu F_{g_1} = \boxed{0.43\ N}$$

Hecht p131 q 41, 45, 68, 69, 71, 81, 92(hard), 95

p133-
questions 75, 79, 93, 103, 106, 116